


PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 9321-3 WJG		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/CA98/01054	International filing date (day/month/year) 10/11/1998	Priority date (day/month/year) 12/11/1997
International Patent Classification (IPC) or national classification and IPC A23L1/01		
Applicant CHIPPERY POTATO CHIP FACTORY, INC. et al.		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 12 sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input checked="" type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input checked="" type="checkbox"/> Certain observations on the international application 		
Date of submission of the demand 27/05/1999		Date of completion of this report 9 1. 12. 99
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer Rauter, A Telephone No. +49 89 2399 8645



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International application No. PCT/CA98/01054

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

5-10,12-14 as originally filed

1-4,4a,11,11a as received on 03/11/1999 with letter of 29/10/1999

Claims, No.:

1-23 as received on 03/11/1999 with letter of 29/10/1999

Drawings, sheets:

1/4-4/4 as originally filed

2. The amendments have resulted in the cancellation of:

☐ the description, pages:

☐ the claims, Nos.:

☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

☐ restricted the claims.

☐ paid additional fees.

☐ paid additional fees under protest.

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☐ neither restricted nor paid additional fees.

2. ☒ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

☐ complied with.

☒ not complied with for the following reasons:

see separate sheet

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

☒ all parts.

☐ the parts relating to claims Nos. .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1 - 23
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1 - 19
	No:	Claims	20 - 23
Industrial applicability (IA)	Yes:	Claims	1 - 23
	No:	Claims	

2. Citations and explanations

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

SECTION IV.

1. Independent claims 1, 18 and 10 and 19 relate to an apparatus and to a method which comprise among other essential features the new and inventive feature that speed control of either the slicing means or the conveying means is related to a pre-determined temperature increase of the oil bath. However, the slicer as worded in independent claim 20 does not show this new and inventive feature which only could be regarded as linking all the claims as to form a single general inventive concept (Rule 13 PCT) of the application.

SECTION V.

1. Reference is made to the following documents:

D1: US-A-4 152 975
D2: US-A-5 193 440
D3: US-A-3 763 764
D4: GB-A-1 263 923
D5: US-A-4 706 556
D6: US-A-4 228 730
D7: US-A-4 546 684
D8: DE-A-19 548 209
D9: US-A-3 280 723

2. The present application satisfies the criteria set forth in Article 33(1) PCT because the subject-matters of claims 1 - 19 is new in respect of prior art as defined in the regulations (Rule 64(1)-(3) PCT), involves an inventive step (Rule 65(1)(2) PCT) and is considered industrially applicable.

Presently claimed apparatus for preparing potato chips according to claim 1 differs essentially from the apparatus as disclosed in D1 (see eg the claims; figure 1 and corresponding description; column 5, line 60 - column 6, line 10) in the slicer means, ie in that the speed of rotation of the knife of the slicer means is adapted to increase as the temperature is increased above a pre-determined temperature.

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A corresponding procedural feature is essential according to the method claimed in claim 10. There are no indications given in the available prior art which could have suggested such a solution to a person skilled in the art to solve the problem of improving the manufacture of potato chips.

Dependent claims 2 - 9 and 11 - 17 can follow as they define specific embodiments of the new and inventive subject-matter of claims 1 and 10.

The apparatus of claim 18 is similarly different from the closest prior art of D1 in that the means for conveying the foodstuffs is of such kind that the speed of the conveyor is increased as the temperature increases above a predetermined temperature. The corresponding method claim 19 comprises the said essential feature. Insofar likewise as above novelty and inventive step can be acknowledged.

3. The subject-matter of independent claim 20 and dependent claims 21 - 23 does not involve an inventive step (Rule 65(1)(2) PCT).

With claims 20 - 23 the applicant claims a slicer which can be regarded as novel with regard to the closest prior art of D5 since a tapered region cannot be derived by its disclosure. However, D1 indicates such an embodiment and thus it can be concluded that a person skilled in the art can arrive at present combination in an obvious manner. Thus for the subject-matter as claimed in claims 20 - 23 an inventive step cannot be acknowledged.

SECTION VIII.

1. The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

Method And Apparatus For Frying Potato Chips And Related Foodstuffs

5 The present invention relates to a method and apparatus for the frying of potato chips, and other foodstuffs, and especially to such a method and apparatus that is compact and intended for use on demand and in a fast food outlet e.g. in shopping malls, food stores, restaurants, stadiums, amusement parks and the like.

10 Methods and apparatus for the manufacture of potato chips are known. Such methods usually involve the slicing of the potato and the insertion of the sliced potato into heated oil to effect frying of the potato chip. The potato chip is conveyed through the oil, normally being submerged for at least part of the period of time that the potato chip is in the oil, and then removed from the frying oil. In most instances, the potato chip is packaged in appropriate
15 containers or packages and shipped for subsequent sale to the consumer. Such sale may not occur for several weeks or months.

The methods for the preparation of potato chips include methods in which the temperature of the oil is varied during the process or in which the potato chip is pre-treated prior to being immersed in the frying oil. Examples
20 of such methods include the methods disclosed in U.S Patents 4366749, 4863750, 4929461, 5137740 and 5580598.

Attempts have been made to produce potato chips on a smaller scale, with the intention that the potato chips would be made available to the consumer shortly after preparation. In particular, attempts have been made to
25 provide freshly made potato chips to the consumer in fast food outlets, using apparatus that is substantially smaller than is used in large scale manufacturing processes for potato chips. Such a method and apparatus is disclosed in U.S. Patent 4 706 556. The method of the patent included heat transfer bars in the bottom of the tank, or kettle, used in the frying to improve
30 efficiency of the process, a potato washing station and variable speed motors for both the potato slicer and the conveyer system so that the speed of the slicer and conveyer could be co-ordinated with the volume of potato chips being processed. It is understood that, in practice, the apparatus of this

patent provided inconsistent product, at least in part due to control mechanisms used in the apparatus.

5 Apparatus for preparing cooking potato chips is disclosed in US Patent No. 4152975. The apparatus has a conveyor for receiving thin slices cut from a raw potato and conveying the slices along a sinuous path through a heated oil bath. Apparatus in which partially cooked potato slices are re-immersed in cooking oil is described in US Patent 5193440. US 3763764 describes
10 apparatus for the cooking of taco shells, including means for forming the shells into shape and then cooking the shells. GB Patent 1263923 relates to a process for the treating of yeast products to remove characteristic odours involving contacting yeast material with an edible oil or fat at elevated temperature. US Patent 4228730 describes a process for cooking french fried
15 (potato chips) involving conveying frozen potato pieces from a hopper to a bath. A second conveyor submerges the potato pieces during cooking.

US Patent 4546684 discloses a potato slicer having a feed tube and an upwardly tapered wall that wedges a potato during slicing. DE 19548209 describes a slicer with a flap for holding vegetables in position during slicing.

20 Apparatus for preparing potato chips is disclosed in U.S. Patent 3 280 723. The apparatus includes a potato slicer having a potato chute with a smooth inner surface and side walls with a helical contour that converge at the end of the chute. It is stated that the helical walls are arranged so that the curved and narrowing passage leads the potatoes in the direction of rotation
25 of the cutting blade.

An improved method for the manufacture of potato chips so as to provide fresh potato chips to the consumer, especially for use in a fast food outlet, or in other food outlets, is required. Such a method and apparatus has now been found.

30 Accordingly, one aspect of the present invention provides apparatus for preparing potato chips, said apparatus having a slicer for the slicing of potatoes, means for conveying sliced potatoes through a heated oil bath and for removal of cooked potato chips from the heated oil bath, said slicer comprising a knife blade that rotates at the lower end of a hopper for

potatoes, the knife blade being adapted to slice potatoes, the sliced potatoes being fed to the heated bath, the speed of rotation of the knife blade being adapted to be controlled so that the knife blade is stationary when the temperature of the oil bath is below a pre-determined temperature, and the speed of rotation of the knife blade being adapted to be further controlled so that the speed of rotation increases as the temperature is increased above said pre-determined temperature.

A further aspect of the present invention provides a method for the preparation of potato chips in apparatus comprising a slicer for the slicing of potatoes, means for conveying sliced potatoes through a heated oil bath and for removal of cooked potato chips from the heated oil bath, said slicer comprising a knife blade that rotates at the lower end of a hopper for potatoes, the knife blade being adapted to slice potatoes, the sliced potatoes being fed to the heated bath, said method comprising causing the knife blade to be stationary when the temperature of the oil bath is below a pre-determined temperature, rotating the knife blade when said temperature is at or above said pre-determined temperature and increasing the speed of rotation of the knife blade as the temperature is increased above said pre-determined temperature.

A further aspect of the invention provides a slicer for preparing potato chips, comprising:

a rotatable disc having a radial slot therein and a slicing blade projecting above the plane of the disc; and
a chute for downwardly conveying potatoes to said rotatable disc;
an orifice between said chute and said rotatable disc, said orifice having a shape that decreases in depth in the direction of rotation of the rotatable disc.

In a preferred embodiment of the present invention, the orifice is in an ovate shape of decreasing depth in the direction of rotation of the slicing blade.

In a further preferred embodiment of the slicer, the chute is at an acute angle with respect to the direction of rotation of the disc, and in particular

terminates in a housing covering and conforming to the said ovate shape.

Another aspect of the invention provides apparatus for the preparing of
5 potato chips, having a potato slicer, a heated oil bath, a conveyor for the
conveying of potato slices through the heated oil bath and means for the
removal of cooked potato chips from the heated oil bath, in which the slicer for
preparing said potato chips comprises (i) a rotatable disc having a radial slot
therein and a slicing blade projecting above the plane of the disc; and (ii) a
10 chute for downwardly conveying potatoes to said rotatable disc;

an orifice between said chute and said rotatable disc, said orifice
having a shape that decreases in depth in the direction of rotation of the
rotatable disc.

In a preferred embodiment of the present invention, the orifice is in an
15 ovate shape of decreasing depth in the direction of rotation of the slicing
blade.

Another aspect of the invention provides a method for the preparing of
potato chips in apparatus having a potato slicer, a heated oil bath, a conveyor
for the conveying of potato slices through the heated oil bath and means for
20 the removal of cooked potato chips from the heated oil bath, in which the
slicer for preparing said potato chips comprises (i) a rotatable disc having a
radial slot therein and a slicing blade projecting above the plane of the disc;
and (ii) a chute for downwardly conveying potatoes to said rotatable disc;

an orifice between said chute and said rotatable disc, said orifice
25 having a shape that decreases in width in the direction of rotation of the
rotatable disc;

said method comprising feeding potatoes into the chute of the potato
slicer, rotating said disc having the blade extending upwards therefrom by
means of which each said potato to be sliced is urged into the narrow end of
30 the tear drop and sliced by said blade, submerging said sliced potato chip in
the heated oil bath and removing said potato chip when cooked.

In a preferred embodiment of the present invention, the orifice is in an
ovate shape of decreasing width in the direction of rotation of the rotatable
disc.

A chute for downwardly conveying potatoes to said rotatable disc;
 an orifice between said chute and said rotatable disc, said orifice
 5 having a shape that decreases in width in the direction of rotation of the
 rotatable disc.

In a preferred embodiment of the present invention, the orifice is in an
 ovate shape of decreasing width in the direction of rotation of the slicing
 blade.

10 In another embodiment, the chute has an elbow therein.

Another aspect of the invention provides apparatus for preparing
 foodstuffs, said apparatus having means for conveying said foodstuffs through
 a heated oil bath and for removal of cooked foodstuffs from the heated oil
 bath, said apparatus having a hopper for the foodstuffs and a conveyor belt
 15 for feeding foodstuffs to the heated bath, the speed of conveying of the
 foodstuffs being controlled so that the conveyor is stationary when the
 temperature of the oil bath is below a pre-determined temperature, and the
 speed of the conveyor being further controlled so that the speed increases as
 the temperature is increased above said pre-determined temperature.

20 A further aspect provides a method for the preparation of foodstuffs in
 apparatus comprising means for conveying the foodstuffs through a heated oil
 bath and for removal of cooked foodstuffs from the heated oil bath, said
 foodstuffs being fed to the heated bath on a conveyor, said method
 comprising causing the conveyor to be stationary when the temperature of the
 25 oil bath is below a pre-determined temperature, and to feed foodstuffs when
 said temperature is at or above said pre-determined temperature and
 increasing the speed of conveying the foodstuffs as the temperature is
 increased above said pre-determined temperature.

In preferred embodiments of the invention, the foodstuffs are corn
 30 chips or tortilla chips.

The present invention is illustrated by the embodiments shown in the

Figure 4 shows the chute and slicer used for the preparation of the potato chips. Chute 4 is shown as connected to chute plate 40. Adjacent to chute plate 40, chute 4 extends forwards in the direction of rotation of slicer blade 6, forming slicer base 5. In doing so, slicer base 5 forms an extended region, which preferably conforms to the shape of slicer hole 45, more clearly shown in the plan view of Figure 5. Chute plate 40 is connected to plate handle 41 which pivots about plate pivot 42. Located beneath chute plate 40 is slicer 6, having knife blade 43 and slicer blade slot 44 therein. Slicer blade 43 and slicer blade 44 are co-operatively located beneath chute 4, being beneath slicer hole (orifice) 45. In preferred embodiments, slicer blade 44 is adjustable, so that the thickness of the potato slice may be adjusted.

Fig. 5 shows a plan view of the chute shown in Fig. 4. Plate handle 41 pivots about plate pivot 42, and conveniently has handle bar 46 thereon. Slicer hole 45 is shown in Fig. 5, and is located beneath chute 4, as shown in Fig. 4. While a variety of shapes of holes made be used for slicer hole 45, such shapes are generally a tapered ovate shape, e.g. pear shaped or tear drop shaped. Such shapes are characterized by a decreasing width in the direction of rotation of slicer blade 6, shown in Fig. 5. In the embodiment shown in Fig. 5, the forward part of orifice 45 is rounded or otherwise curved, but more rectilinear shapes may be used. It is an important feature that the shape of orifice 45 decrease in the direction of rotation of slicer blade 6, so that a potato in chute 40 is urged forward for ease of slicing. This prevents the potato, especially relatively small unsliced potato parts of the potato, to roll like ball bearings at the entrance to slicer hole 45, being turned by slicer blade 6 with minimal slicing of the potato. The urging forward tends to retain the potato in a position where it may be sliced by slicer blade 43. The end 48 of orifice 45 may be rounded or more pointed. In the preferred embodiment of the present invention, slicer hole 45 is in the shape of a tear drop, optionally a truncated tear drop or a tear drop with rounded point, for reasons discussed herein.

Although not shown in Fig. 5, a drive motor would be provided, to

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effect rotation of the sheer blade. In addition, a mechanism should be provided to reduce the speed of rotation of the slicer blade, when required.

- 5 In operation, a potato P is cleaned, or less preferably peeled and cleaned, and placed into chute 4. Potato P passes, by gravity, down chute 4 to the bottom thereof. On rotation of slicer 6, knife blade 43 cuts a slice from

CLAIMS:

1. Apparatus for preparing potato chips, said apparatus having a slicer for the slicing of potatoes, means for conveying sliced potatoes through
5 a heated oil bath and for removal of cooked potato chips from the heated oil bath, said slicer comprising a knife blade that rotates at the lower end of a chute for potatoes, the knife blade being adapted to slice potatoes, the sliced potatoes being fed to the heated bath, the speed of rotation of the knife blade being adapted to be controlled so that the knife blade is stationary when the
10 temperature of the oil bath is below a pre-determined temperature, and the speed of rotation of the knife blade being adapted to be further controlled so that the speed of rotation increases as the temperature is increased above said pre-determined temperature.
- 15 2. The apparatus of Claim 1 in which the knife blade is adapted to slice potatoes and feed each potato slice separately to the oil bath.
- 20 3. The apparatus of Claim 1 or Claim 2 in which the oil is adapted to be heated using an electric heat exchanger.
4. The apparatus of Claim 1 or Claim 2 in which the oil is adapted to be heated using gas.
- 25 5. The apparatus of any one of Claims 1-4 in which the slicer comprises:
a rotatable disc having a radial slot therein and said knife blade projecting above the plane of the disc;
a chute for downwardly conveying potatoes to said rotatable disc;
30 and
an orifice between said chute and said rotatable disc;

5 said chute having a region tapering and extending forwards in the direction of rotation of the disc, said orifice between said chute and said rotatable disc including being at said region of the chute, said orifice having a shape that decreases in width in the direction of rotation of the rotatable disc.

10 6. The apparatus of Claim 5 in which the orifice is in an ovate shape of decreasing width in the direction of rotation of the slicing blade.

7. The apparatus of Claim 5 in which the chute is at an acute angle with respect to the direction of rotation of the disc.

15 8. The apparatus of Claim 6 in which the chute terminates in a housing covering and conforming to the said ovate shape.

9. The apparatus of any one of Claims 1-8 in which the chute has an elbow therein.

20 10. A method for the preparation of potato chips in apparatus comprising a slicer for the slicing of potatoes, means for conveying sliced potatoes through a heated oil bath and for removal of cooked potato chips from the heated oil bath, said slicer comprising a knife blade that rotates at the lower end of a chute for potatoes, the knife
25 blade being adapted to slice potatoes, the sliced potatoes being fed to the heated bath, said method comprising causing the knife blade to be stationary when the temperature of the oil bath is below a pre-determined temperature, rotating the knife blade when said temperature is at or above said pre-determined temperature and increasing the

speed of rotation of the knife blade as the temperature is increased above said pre-determined temperature.

11. The method of Claim 10 in which each of said sliced
5 potatoes is fed separately to the oil bath.

12. The method of Claim 10 or Claim 11 in which said predetermined temperature is about 170°C.

10 13. The method of Claim 12 in which the rotation of the knife blade ceases if the temperature increases to about 195°C or above.

14. The method of any one of Claims 10-13 in which the slicer for slicing said potatoes comprises:

15 a rotatable disc having a radial slot therein and a knife blade projecting above the plane of the disc;

a chute for downwardly conveying potatoes to said rotatable disc;
and

an orifice between said chute and said rotatable disc;
20 said chute having a region tapering and extending forwards in the direction of rotation of the disc, said orifice between said chute and said rotatable disc including being at said region of the chute, said orifice having a shape that decreases in width in the direction of rotation of the rotatable disc;

25 said method comprising feeding potatoes into the chute of the potato slicer, rotating said disc having the blade extending upwards therefrom by means of which each said potato to be sliced is urged into the said region and sliced by said blade, submerging said sliced potato chip in the heated oil bath and removing said potato chip when cooked.

30

15. The method of Claim 14 in which the orifice is an ovate shape of decreasing width in the direction of rotation of the blade.

5 16. The method of Claim 14 or Claim 15 in which each potato is fed separately to the chute.

17. The method of any one of Claims 10-16 in which the chute has an elbow therein.

10 18. Apparatus for preparing foodstuffs, said apparatus having means for conveying said foodstuffs through a heated oil bath and for removal of cooked foodstuffs from the heated oil bath, said apparatus having a hopper for the foodstuffs and a conveyor belt for feeding foodstuffs to the heated bath, the speed of conveying of the foodstuffs
15 being controlled so that the conveyor is stationary when the temperature of the oil bath is below a pre-determined temperature, and the speed of the conveyor being further controlled so that the speed increases as the temperature is increased above said pre-determined temperature, characterized in that said foodstuffs are corn chips or
20 tortilla chips.

19. A method for the preparation of foodstuffs in apparatus comprising means for conveying the foodstuffs through a heated oil bath and for removal of cooked foodstuffs from the heated oil bath, said
25 foodstuffs being fed to the heated bath on a conveyor, said method comprising causing the conveyor to be stationary when the temperature of the oil bath is below a pre-determined temperature, and to feed foodstuffs when said temperature is at or above said pre-determined temperature and increasing the speed of conveying the foodstuffs as

the temperature is increased above said pre-determined temperature, characterized in that said foodstuffs are corn chips or tortilla chips.

- 5 20. A slicer for apparatus for slicing of potatoes, comprising:
 a rotatable disc having a radial slot therein and a knife blade
 projecting above the plane of the disc;
 a chute for downwardly conveying potatoes to said rotatable disc,
 the chute being at an acute angle with respect to the direction of
 rotation of the disc; and
 10 an orifice between said chute and said rotatable disc;
 said chute having a region tapering and extending forwards in the
 direction of rotation of the disc, said orifice between said chute and said
 rotatable disc including being at said region of the chute, said orifice
 having a shape that decreases in width in the direction of rotation of the
 15 rotatable disc.

21. The slicer of Claim 20 in which the orifice is an ovate
 shape of decreasing width in the direction of rotation of the blade.

- 20 22. The slicer of Claim 20 or Claim 21 in which the chute has
 an elbow therein.

23. The slicer of any one of Claims 20-22 in which the orifice is
 of a tear drop shape, with the narrow end pointed in the direction of
 25 rotation of the slicer.